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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/224,759	01/04/1999	TOSHIHARU FURUKAWA	BU9-98-179	3284

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SCHMEISER OLSEN & WATTS
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SUITE # 101
MESA, AZ 85201

EXAMINER

GARCIA, JOANNIE A

ART UNIT PAPER NUMBER

2823

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/224,759

Applicant(s)

FURUKAWA ET AL

Examiner

Joannie A Garcia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10,14,15,17,23,24 and 36-53 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,14,15,17,23,24 and 36-53 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____.

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The finality of the office action mailed 1/27/03 is withdrawn.
Claims 25-35 depend on a claim, which has been withdrawn from consideration (i.e.,

claim 22). Therefore, claims 25-35 should be deleted.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 52-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 52 recites the limitation "surface" in line 5. There is insufficient antecedent basis for this limitation in the claim.

In claim 52, lines 4, 5, and 7, "a" before "portion of the at least one structure" should be deleted.

In claim 52, line 10, "a" before "portion of the at least" should be deleted.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-7, 14, 15, 23, 24, 36, 37, 42, and 47-50, are rejected under 35

U.S.C. 102(e) as being anticipated by Mase et al (U.S. Patent 6,200,868).

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Mase et al teaches forming a plurality of polysilicon portions of gate conductors 14 on a substrate having a semiconductor portion 80 (Figure 7, Column 9, lines 60-67, and Column 10, lines 35-52), trimming at least an electrically significant portion of the polysilicon portion by a selective film growth method, such as selective surface nitridation (Figures 4 and 8, Column 10, lines 53-55, and Column 11, lines 3-5), compensating n-channel and p-channel devices (Column 6, lines 54-60, and Column 12, lines 47-50), at least partially removing the trimming film (Column 11, lines 3-5), anisotropically etching the trimming film to form gate conductor spacers 13 (Figures 4 and 8, Column 11, lines 9-27), and forming an additional oxide layer 17 on the trimming film (Figure 7, Column 6, lines 17-22, Column 9, lines 60-67, and Column 11, lines 28-31). (Column 10, lines 15-34, and Column 11).

Claims 8-10, 17, 38-41, 43-46, and 51, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mase et al as applied to claims 1, 2, 4-7, 14, 15, 23, 24, 36, 37, 42, and 47-50 above, and further in view of Moslehi et al (U.S. Patent 4,715,937).

Mase et al does not teach performing the selective surface nitridation exposing structures formed on the semiconductor portion to 50-1000 expose pulses of laser irradiation with an energy fluence of 200-700 mJ/cm² in the presence of ammonia at a pressure of 10-1500 Torr, performing the selective surface nitridation exposing structures formed on the semiconductor portion to 150 expose pulses of 308 nm laser irradiation with an energy fluence of 400-500 mJ/cm² in the presence of ammonia at a pressure of 300-500 Torr, wherein ammonia is supplied at about 100 ccm/min, and trimming the polysilicon portion to a depth within the range of 10 to 100 nanometers.

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Moslehi et al discloses the use of laser and ammonia for growing thermal nitrides of silicon (Column 1, lines 21-31). It would have been within the scope of one ordinary skill in the art to combine the teachings of Moslehi et al and Mase et al to enable the gate conductor trimming step to be performed and also to obtain an ultra-thin, high quality insulators (Moslehi et al, Column 1, lines 15-18).

It would have been a matter of routine optimization within the teachings of Moslehi et al and Mase et al to determine suitable expose pulses, depth, energy, pressure, and flow to achieve Mase's et al trimmed gate conductor step.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 52 is rejected under 35 U.S.C. 102(e) as being anticipated by Shoji (U.S. Patent 6,214,684).

Shoji discloses a method for trimming at least a portion of at least one structure 4 on a semiconductor substrate 1 (Figures 13-14) comprising opening a mask to expose the at least portion of the at least one structure (Column 13, lines 59-60, Column 14, lines 66-67, Column 15, lines 57-59, and Column 17, lines 61-64), abutting a surface of the at least portion of the at least one structure with a pressurized nitrogen compound atmosphere (Column 13, lines 60-64, and Column 36, line 32), and producing a nitride film on the at least portion of the at least one

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structure by irradiating the at least portion of the at least one structure through the open mask with a laser (Figures 13-14, Column 9, lines 5-13, Column 13, lines 58-67, Column 14, lines 65-67, Column 15, lines 11-14, and 53-59, Column 17, lines 61-64, and Column 36, lines 30-35).


Claim 53 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. **See MPEP 203.08.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner J. Garcia whose telephone number is (703) 306-5733. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax number for this group is (703) 308-7722 (and 7724), and (703) 305-3431 (and 3432). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.


JAG
6/24/03


George Fourson
Primary Examiner